

A Q U A P H Y T E

A NEWSLETTER ABOUT AQUATIC, WETLAND AND INVASIVE PLANTS

Center for Aquatic and Invasive Plants

with support from

The Florida Fish and Wildlife Conservation Commission,
Invasive Plant Management Section
The St. Johns River Water Management District

UF UNIVERSITY of
FLORIDA
IFAS Extension

Volume 28 Number 1 Fall 2008

Gainesville, Florida

ISSN 0893-7702

Center's Website Refreshed!

Websites are an extremely popular and efficient form of information dissemination. The technology for delivering websites changes rapidly and the public expects a fresh and interesting layout, newly available video formats, easy navigation, and current content. The University of Florida/IFAS Center for Aquatic and Invasive Plants (CAIP) Information Office, under the direction of Victor Ramey, created the original website and placed it online in 1995. It included plant information and images, the Aquatic Plant Information Retrieval System (APIRS) bibliographic database, the Aquaphyte newsletter, and more. Over the last dozen years, three portals or gateways have been added to direct viewers to even more information on aquatic and wetland plants around the world, and invasive non-native plants in Florida's natural areas.

Primary CAIP/APIRS Website

<http://plants.ifas.ufl.edu/>

In 2005, a major overhaul and update of the primary website was initiated. After being online for ten years, the underlying framework and organization of the original website was outdated. New technology was quickly becoming available to enhance navigation, delivery and appearance. The newly refurbished website finally went online this summer and definitely deserves a revisit by those who have not been to this site recently. The overhaul and update were accomplished by website designer Elizabeth Hathaway.

A major enhancement has been the addition of 102 aquatic plant identification video segments to each respective Plant Information page. These segments were completed as a video series in the late 1990s. They were subsequently converted to digital formats, enabling them to be viewed on the CAIP website as individual 2-3 minute identification video segments. Look for the video icon in the Plant Information and Images section of the website.

A new series of identification videos on Florida upland invasive plant species was initiated in 2007-2008. Six segments were produced and have been uploaded to the Plant Information and Images pages for viewing.

The aquatic plant photographic image collection is being

refreshed using technology that was not available when the initial website was developed. The CAIP receives requests for 450 - 700 images annually, including our botanically accurate line drawings. Sample uses include brochures, agency reports, textbooks, educational websites, gardening and other magazines, PowerPoint™ and other multi-media presentations, student papers, poster presentations, and more. A good example is the recent publication in *Hydrobiologia* (2008) 595:9-26, *Global diversity of aquatic macrophytes in freshwater*, by P.A. Chambers, P. Lacoul, K.J. Murphy, and S.M. Thomaz, in which line drawings produced by the CAIP were used. Image requests continue to come from all over the world, including Canada, Belgium, France, Poland, and Nigeria, to name just a few.

Plant Management in Florida Waters

<http://plants.ifas.ufl.edu/guide>

This portal was created in cooperation with the Florida Department of Environmental Protection's Bureau of Invasive Plant Management (now under the direction of the Florida Fish and Wildlife Conservation Commission (see article, p. 4)). Topics within this encyclopedia-style portal have been researched in the APIRS and other libraries, written for the non-scientific public, and reviewed by content experts. More than 400 major and minor topics are addressed and indexed. Aside from the tremendous reception from the general public, the Plant Management in Florida Waters portal also is proving to be especially helpful to professionals in the field. Aquatic herbicide applicators are encouraged to carry a supply of "web cards" for citizens who have questions about plant management activities. This web card refers interested people to the website, which is a reliable source of accurate information about aquatic plant management. Thus, a useful tool is put into the hands of pesticide applicators for their interactions with the public, and a trusted University of Florida website is made readily available to those with questions and concerns about aquatic plant management. Web cards also are distributed at various environmental education events throughout the year to publicize this Internet resource and to make the public aware of invasive plants as an important environmental topic.



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Portals to Education

Since 2005, the CAIP Information Office and the Bureau have collaborated on the **Florida Invasive Plant Education Initiative and Curricula** portal at <http://plants.ifas.ufl.edu/education>, and the **Florida Invasive Plant Education Initiative – In the Parks** portal at <http://plants.ifas.ufl.edu/parks/> under the direction of Amy Richard. The primary goal of both programs is to raise public awareness of invasive plant problems in Florida.

The first portal is for particular use by science teachers and supports extensive programs developed to provide in-service training to Florida science teachers. Training topics include plant identification of native, non-native and invasive plants; the ecological and economic impacts of non-native invasive plants in Florida; the numerous management issues regarding invasive plants; and invasive plant prevention strategies.

The latter portal is for particular use by Florida State Park rangers, biologists, environmental volunteers and other staff. It provides management and identification information for native, non-native and invasive plants, including comprehensive invasive plant management plans for 42 species; a glossary of plant terms; and an invasive plant brochure template that can be customized for individual parks; 90 individual PDF files on invasive and non-native plant species (from the *Invasive and Non-native Plants You Should Know – Recognition Cards* publication); and a *Find Plants in Your Region* section with links to native and non-native plant information for all of the five Florida State Park Districts.

Additional Website Projects

The *IFAS Assessment of Non-Native Plants in Florida's Natural Areas* website was developed by the UF/IFAS Invasive Plants Working Group so that University of Florida-IFAS Extension faculty from all departments could provide consistent recommendations concerning the use of non-native plants. The IFAS Assessment is available on the CAIP primary website (<http://plants.ifas.ufl.edu/assessment/>), and new results are posted periodically.

The *Osceola County Hydrilla and Hygrophila Demonstration Project* website (<http://plants.ifas.ufl.edu/osceola/>) describes a US Environmental Protection Agency (EPA) funded project examining the biology of *Hydrilla verticillata* and *Hygrophila polysperma*, invasive species management strategies, and new research and technologies under development. The site is used to communicate with residents of Osceola County and other interested groups about aquatic plant management activities that are occurring throughout the county. This is a cooperative project with the UF-IFAS Osceola County Extension Office, Osceola County, and the EPA.

CAIP Website Program Staff:

Karen Brown, Content Manager
Amy Richard, Education Coordinator
Elizabeth Hathaway, Website Designer

APIRS

In order for researchers and natural area managers to conduct research and apply invasive plant management techniques in the most efficient and informed manner, it is essential that they be apprised of the total body of scientific literature surrounding each species of concern. This literature is widely scattered in international, national, and regional journals, in proceedings from professional symposia, in books, and in agency reports. Much of this literature, especially the “gray literature” (proceedings, state and federal agency reports, etc.) often is not available using common Internet searches (although this is rapidly changing), and it is not collected under one database “umbrella.” This complicates literature searching by individuals and necessitates multiple, individual site visits, author contacts, and/or academic library access to multiple databases for locating published research.

Since the early 1980s, the **Aquatic Plant Information Retrieval System (APIRS)** has been developed as a source of bibliographic information for both aquatic and upland invasive plant researchers, managers, graduate students and others around the world. This information includes the scientific literature (research articles, books, and reports) about aquatic and wetland plants worldwide, and upland invasive plant species listed by the Florida Exotic Pest Plant Council (FLEPPC). APIRS staff continues to identify and catalog the scientific literature in these areas. Annotated citations (not full-text) are uploaded to the APIRS online database and made freely available to environmental managers, scientists, graduate students and others via the website:
<http://plants.ifas.ufl.edu/APIRS>

During the past year, approximately 2,600 new records were added to the APIRS database, and there are more than 71,000 annotated citations in the APIRS Online database in total. Citations include plant lists and keywords provided by reader/cataloger Mary Langeland.

According to Google Analytics™, the APIRS database has received almost 20,000 queries in the past year. Visitors range from 121 different countries/territories, with the majority (65%) from the U.S. By continent, visits to APIRS were as follows: Americas, 5,272; Europe, 1,032; Asia, 651; Oceania, 173; Africa, 99; Others, 7.

APIRS welcomes contributions of publications for the citation database, either as reprints or as PDF files. Only annotated citations are entered into the database.

See sample citations in the *From the Database* section on pages 10-13, and *Mary's Picks* on page 8.

APIRS Staff:

Karen Brown, Database Manager
Mary Langeland, Reader/Cataloger
Lynda Dillon, Program Assistant

Florida's Invasive Plant Education Initiative

by Amy Richard, Coordinator

In 2005, the Florida Invasive Plant Education Initiative was launched as a collaborative effort between the CAIP Information Office and the Florida DEP's Bureau of Invasive Plant Management (see Aquaphyte Volume 25, Number 2 Winter 2005). Staff at the CAIP Information Office began to work with teachers to find ways to meld the wealth of preexisting CAIP educational materials and resources into science lessons and activities that could be used in classrooms around the state in a concerted way. This initiative, which focuses largely on aquatic plants, also includes upland invasive plants, and is among the first of its kind in the United States.

Teaching Modules

For the past three years, we not only have been assembling and distributing resources for teachers to use in the classroom, but have also developed content and delivery strategies for a number of core lessons or teaching modules. The modules are designed to cover science topics and activities that teachers are required to teach to meet state standards and benchmarks, and are delivered on the web via QuickTime and FLASH in an effort to make the presentations available 24 hours a day, seven days a week, in keeping with current "new media" trends and technology. During the development process, groups of teachers throughout Florida were asked to review and provide feedback on the content and presentation of these core lessons and activities. This inclusive approach was appreciated and contributes to the enthusiasm many educators have for the materials.

The intention of these lessons is to provide the tools for students to become responsible environmental stewards as adults. In addition, they deliver a message that hopefully will help ease some of the conflicts and negative attitudes often directed at the plant management arena by citizens unaware of the problems and expense created by invasive plants in Florida and elsewhere.

PLANT CAMP!

The Education Initiative is the first program to provide such intensive in-service training for Florida science teachers (i.e., upper elementary, middle and high school levels) on the subject of aquatic and upland invasive plants. These annual "PLANT CAMPS," held for 4.5 days in mid-June, include field trips and rigorous hands-on plant identification activities as a way of generating excitement and interest in the curriculum. Teachers also earn as many as forty hours of professional development continuing education units (CEUs). Ultimately, the camps provide teachers with greater background knowledge on Florida's native, non-native and invasive plants before they begin to teach the topic to their students. So far, the Initiative has trained 94 teachers. At least 250 teachers have been introduced to the

materials/lessons on a more limited basis as a result of outreach mini-workshops and events.

For the past two years, we have added information and training about invasive animal species to our PLANT CAMPS by collaborating with the Florida Fish and Wildlife Conservation Commission (FWC) Project WILD program, a wildlife-focused conservation and environmental education program for educators and their students (kindergarten through high school). This year, PLANT CAMP participants graduated from the 4-day workshop with both Invasive Plant and Project WILD certification. It is hoped that as a result of this collaboration, Florida's future taxpayers will have a better understanding of the challenges we all face from invasive species – both plants and animals.



Teachers examine the leaves of water hyacinth plants at the CAIP's 2008 PLANT CAMP.



Center Director Dr. William Haller gives teachers a hands-on learning experience about aquatic plants and their management in Florida waters.

Florida's Invasive Plant Management Program Under New Leadership

By Bill Caton, Section Leader, Invasive Plant Management

Division of Habitat and Species Conservation, Florida Fish and Wildlife Conservation Commission

During the 2008 Session of the Florida Legislature, Senate Bill 1294 was passed and became law on July 1, 2008. This law transferred the authority to direct and operate the State's invasive plant management program from the Department of Environmental Protection (DEP) to the Fish and Wildlife Conservation Commission (FWC) and the Department of Agriculture and Consumer Services (DACS). The FWC is now the lead agency for:

Aquatic Plant Management in Public Water Bodies

- directing the control, eradication, and regulation of noxious aquatic weeds;
- guiding and coordinating the activities of all public bodies, authorities, agencies, and special districts charged with the management of aquatic plants;
- disbursing funds to districts, special districts, or other local authorities for the purpose of operating a program for managing aquatic plants in the waters of state responsibility;
- directing the research and planning related to these activities; and

Upland Invasive Exotic Plant Management on Public Conservation Lands

- achieving eradication or maintenance control of upland invasive exotic plants on public lands;
- assisting state and local government agencies in the development and implementation of coordinated management plans for the eradication or maintenance control of upland invasive exotic plant species on public lands;
- contracting, or entering into agreements, with entities in the State University System or other governmental or private sector entities for research concerning control agents; and the production and growth of biological control agents.

Any person or public agency wanting to control, eradicate, remove, or otherwise alter any aquatic weeds or plants in waters of the state must obtain a permit for such activity from the FWC unless the activity or waters are expressly exempted by FWC rule. DEP's rule chapters 62C-20 and 62C-54, Florida Administrative Code (F.A.C.) have been transferred to the FWC under rule chapters 68F-20 and 68F-54, F.A.C., respectively. The only changes to these rules were technical in nature primarily to change all references of DEP to FWC.

All personnel and equipment of the DEP Bureau of Invasive Plant Management have been transferred to the FWC Invasive Plant Management Section (FWC's equivalent of a Bureau). The FWC Executive Director, Ken Haddad, has clearly stated that initially there will be no change in how the program operates. There are a lot of administrative issues involved with moving a program from one agency to another. After these is-

ssues are worked out and the transition is complete, the agency will look for ways to integrate operations with other internal programs to create improvements and enhance efficiency.

In addition, the portion of the DEP Bureau of Invasive Plant Management responsibility related to the importation, transportation, cultivation and collection of aquatic plants for business purposes and the possession of prohibited aquatic plants was transferred to the DACS by Senate Bill 1294. The DACS now maintains the list that regulates the possession of prohibited aquatic plants. As a result of this change, DACS now has authority over the State's noxious weed list and the prohibited aquatic plant list. Any person wanting to import, transport, cultivate or collect plants for business purposes or possess prohibited plants must obtain a permit from the DACS, Division of Plant Industry.

Additional legislation will be needed in the 2009 session of the Florida Legislature to address unresolved issues regarding the Invasive Plant Control Trust Fund (base funding for aquatic plant control activities that was established by the Legislature in 1971; currently funding comes from fuel taxes, boat registration fees, and documentary stamps), authority for allowing activities on sovereign submerged lands, and regulatory enforcement. FWC is committed to working with the Legislature and stakeholders to get these issues resolved and to ensure that Florida's Invasive Plant Management program continues to be the best of its kind in the nation.

The original Bureau of Aquatic Plant Research and Control was established in 1969 and funded in 1970 under the Florida Department of Natural Resources (DNR). Dr. Alva Burkhalter was appointed Bureau Chief beginning in 1971. The DNR later became the Department of Environmental Protection and the Bureau underwent internal name changes to the Bureau of Aquatic Plant Management, and later, when the Florida Legislature directed the Bureau to begin an upland invasive exotic plant management program, the Bureau of Invasive Plant Management. It is now the Invasive Plant Management Section of the Florida Fish and Wildlife Conservation Commission.

For additional information regarding these changes, contact Bill Caton, Invasive Plant Management Section Leader at 850-245-2809.

Visit the Section website at: <http://myfwc.com/nonnatives/InvasivePlants/index.htm>



At the Center in 2008

by William T. Haller, Acting Director

The Center for Aquatic and Invasive Plants (CAIP) has been very much involved with invasive plant management for the past thirty years. The CAIP is under the auspices of the Institute of Food and Agricultural Sciences (IFAS) at the University of Florida and is responsible for coordinating, facilitating and assisting faculty in pursuing research, extension and teaching issues in invasive plant biology, ecology and control.

Thirty years ago, CAIP-affiliated faculty were evaluating and developing fluridone use for hydrilla control in cooperation with Elanco Products Inc. They were also conducting mechanical harvesting operations/evaluation with the U.S. Army Corps of Engineers in Orange Lake, Florida and evaluating diploid and hybrid (big head x grass carp) carp for hydrilla control. The Aquatic Plant Information Retrieval System (APIRS) citations were being collected and put onto one of the earliest computers so that Vic Ramey could search the database and mail bibliographic lists to requesting scientists.

The CAIP grew under the leadership of former Center directors Arnette Mace, Joe Joyce and Randall Stocker, and its responsibilities expanded into research, education and control of upland invasives in natural areas. The number of faculty, staff and students increased and many federal (Department of Agriculture, Army Corps of Engineers, Department of Interior, Environmental Protection Agency) and state agencies (Department of Environmental Protection, Fish and Wildlife Conservation Commission (FWCC), Department of Agriculture and Consumer Services (FDACS), water management districts, county and private agencies and foundations continue to support research and education programs at the CAIP.

Drs. Alison Fox, Randall Stocker, Vernon Vandiver, David Sutton and Curtis Rainbolt have all retired within the last several years, and budget problems have not allowed for their replacement. Nevertheless, the *IFAS Assessment of Non-native Plants in Florida's Natural Areas* (<http://plants.ifas.ufl.edu/assessment/>), extension training programs such as the UF/IFAS CAIP Aquatic Weed Control Short Course, and the many research efforts conducted by these former staff members continues.

Newer faces around the Center include Jeremy Slade, a new biologist focusing on monitoring of large-scale hydrilla control projects for the Florida FWCC, and post-doctoral associate Lyn Gettys working on ecotypic differentiation of *Vallisneria americana*.

Dr. Chris Mudge completed his PhD degree in December 2007 and is now at Vicksburg, Mississippi with the US Army Corps of Engineers, Waterways Experiment Station. Dr. Tomas Chiconela completed his PhD degree in May 2008 and has assumed teaching responsibilities in plant protection at Eduardo Mondlane University in Maputo, Mozambique. Dr. Mercedes Roquela recently completed a one year sabbatical working on ALS enzymes, herbicide metabolism, and resistance with Dr. Greg MacDonald and Dr. Atul Puri. Dr. Roquela has returned to her weed scientist position at Universidad Pública de Navarra, Pamplona, Spain. Exciting research projects on *Lygodium* control, evaluating new herbicides for aquatic use, searching for insect biocontrols for hydrilla in East Africa, and many other projects keep the scientific staff across Florida at the cutting edge of developing new and improved technologies for invasive plant management.

The annual **Aquatic Weed Control Short Course** held in South Florida at Coral Springs attracted 450 attendees once again in May 2008. Plans are currently underway for the 2009 Short Course to be held at the same location May 4-7, 2009 (<http://conference.ifas.ufl.edu/aw/>) In addition, the second **Northwest Florida Right-of-Way and Aquatic Pesticide Applicator Training Course** will be held in Panama City in late September 2009 (<http://conference.ifas.ufl.edu/applicator/index.htm>).

The CAIP Information Office has redesigned its award winning website (see cover article), and the educational efforts with Florida Fish and Wildlife Conservation staff and CAIP continue at an accelerated pace with the Education Initiative (see pg. 3). As we move into this initial year of collaboration with the Invasive Plant Management Section of the Florida Fish and Wildlife Conservation Commission (formerly the Department of Environmental Protection's Bureau of Invasive Plant Management, we look back and reflect on the breadth of information and materials that have been developed over the past 25+ years with their support. This productive partnership has built a strong foundation of information services thanks to individuals like (the late) Vic Ramey at the CAIP, and Jeff Schardt and Don Schmitz of the new FFWC Invasive Plant Management Section, who recognized the importance of educating Florida's citizens about invasive species. Together, they produced a wide variety of materials that continue to be used on a regular basis by agency personnel, biologists, field technicians, researchers, students and teachers for the purpose of identifying, managing, and learning more about Florida's non-native and invasive plants. Veteran Aquaphyte readers will recognize the numerous items which have been introduced in this newsletter over the years and are also viewable on the newly renovated CAIP website: <http://plants.ifas.ufl.edu/node/596> Please take a moment to visit.

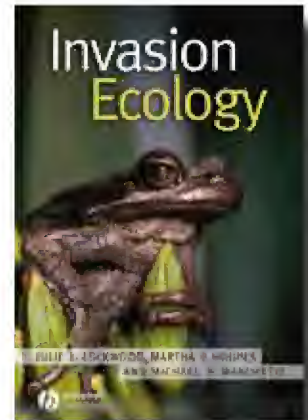


BOOKS/REPORTS, ETC.

INVASION ECOLOGY

By Julie Lockwood, Martha Hoopes, and Michael Marchetti. 2007. 312 pp. ISBN 978-1-4051-1418-9. Blackwell Publishing. www.blackwellpublishing.com/ecology

Highlighting important research findings associated with each stage of non-native invasion, this book provides an overview of the invasion process from transportation patterns and causes of establishment success to ecological impacts, invader management, and post-invasion evolution.



ECOLOGICAL STUDIES 190 AND 191:

WETLANDS AND NATURAL RESOURCE MANAGEMENT

by J.T.A. Verhoeven, B. Beltman, R. Bobbink, and D.F. Whigham, Eds., 2006, and

WETLANDS: FUNCTIONING, BIODIVERSITY CONSERVATION, AND RESTORATION

by R. Bobbink, B. Beltman, J.T.A. Verhoeven, and D.F. Whigham, Eds., 2006. Springer-Verlag.

www.springer.com

These books are based on the highlights of the 7th INTECOL International Wetland Conference in Utrecht in 2004, which brought together approximately 900 participants from 61 countries who discussed a broad range of science, policy, and management related issues regarding wetland ecology and hydrology, conservation and creation, and the impact of global climate change.

THE RIVERSCAPE AND THE RIVER.

By S. M. Haslam. 2008. ISBN 9780521839785. Cambridge University Press. <http://www.cambridge.org/>

Dr. Haslam examines how the quantity, function and ecology of water changes as it moves from watershed to river. The development of river and riverscape, their ecology, the effect of human activities (such as water abstractions, flood control and management for recreational use) and water resources are described both in principle and using case histories. Contrasting examples are given from across the world, including Iceland, Hungary, Malta, Britain and the USA, which enables an understanding of how water and riverscape interact with each other, and with human impact.

PLANT INVASIONS. HUMAN PERCEPTION, ECOLOGICAL IMPACTS AND MANAGEMENT

by B. Tokarska-Guzik, J.H. Brock, G. Brundu, L. Child, C.C. Daehler & P. Pyšek (Eds). 2008, 428 pp. ISBN 978-90-5782-188-2. Backhuys Publishers, www.backhuys.com

Sections include *Human perception and role in biological invasions*; *Biology, ecology and distribution of invasive species*; *Invasibility of habitats and impacts of invasive species*; and *Control and management*. This volume continues the tradition of publishing key presentations from a series of biennial International Conferences on the Ecology and Management of Alien Plant Invasions (EMAPI) beginning in 1992 (see de Waal et al. 1994, Pyšek et al. 1995, Brock et al. 1997, Starfinger et al. 1998, Brundu et al. 2001, Child et al. 2003). This volume aims to contribute to this growing field, exploring human perceptions of plant invasions and the role of humans in the invasion process from different perspectives and geographical areas. It also covers case studies of the biology and ecology of invasive species, mechanisms of invasion and ecological impacts, while offering solutions through a variety of control and management techniques.

FRESHWATER REVIEWS

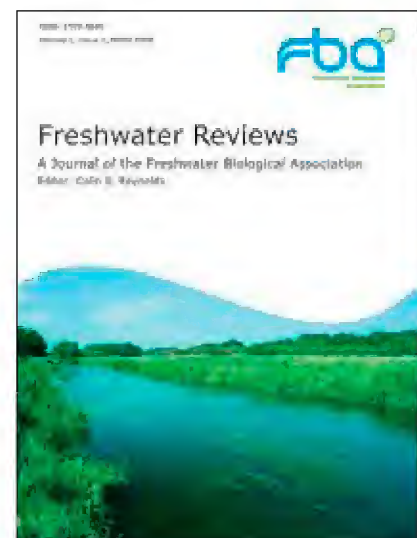
A JOURNAL OF THE FRESHWATER BIOLOGICAL ASSOCIATION.

Editor: Colin S. Reynolds. ISSN: 1755-084X. www.fba.org.uk/journals

Freshwater Reviews is a new peer reviewed scientific journal dedicated to providing comprehensive, modern reviews of topics in the freshwater sciences. It is aimed at a wide, international audience including academics, practitioners, administrators, teachers and students. The content of review papers is primarily biological but papers covering limnology, policy and socio-economic aspects of fresh waters are acceptable if they are relevant to our understanding or management of freshwater biology. Freshwater is interpreted widely, embracing all inland waters including lakes, ponds and reservoirs, rivers and streams, as well as saline and caustic lakes, brackish waters, interstitial and groundwater environments.

Freshwater Reviews is an "online first" journal, publishing articles online as they are accepted, and then in two, full colour, high quality print issues (bi-annually).

Published by the Freshwater Biological Association.



PHYCOLOGY, 4TH EDITION

By Robert Edward Lee. 2008. 560 pp. ISBN-13:9780521682770. Cambridge University Press, New York. Available in paperback, hardback, or eBook. <http://www.cambridge.org/us/>

Detailed life-history drawings of algae are presented alongside information on the cytology, ecology, biochemistry, and economic importance of selected genera. Suitable for upper-level undergraduate and graduate students following courses in phycology, limnology or biological oceanography. Emphasis is placed on those algae that are commonly covered in phycology courses, and encountered by students in marine and freshwater habitats.

MAINE FIELD GUIDE TO INVASIVE AQUATIC PLANTS AND THEIR COMMON NATIVE LOOKALIKES*

By R. Hill and S. Williams, *Maine Center for Invasive Aquatic Plants and the Maine Volunteer Lake Monitoring Program*. 2007. 146 pp. www.mainevolunteerlakemonitors.org

Spiral-bound and printed on waterproof paper, this handy field guide is dedicated to Maine's volunteer lake monitors. The Maine Volunteer Lake Monitoring Program is the longest standing citizen lake monitoring program in the U.S., and the largest provider of scientific lake data in the State of Maine. This book includes a simplified dichotomous key, detailed plant descriptions, a section on Maine's eleven most unwanted invasive aquatic plants, range maps, line drawings, and color photographs of each of the fifty-plus species covered. Also included is a section on how to conduct an invasive aquatic plant screening survey, and descriptions of other invaders in Maine, both flora and fauna.

GUIDE DE RECONNAISSANCE DES HABITATS FORESTIERS DES PLANTES MENACÉES OU VULNÉRABLES. CAPITALE-NATIONALE, CENTRE-DU-QUÉBEC, CHAUDIÈRE-APPALACHES ET MAURICIE. *

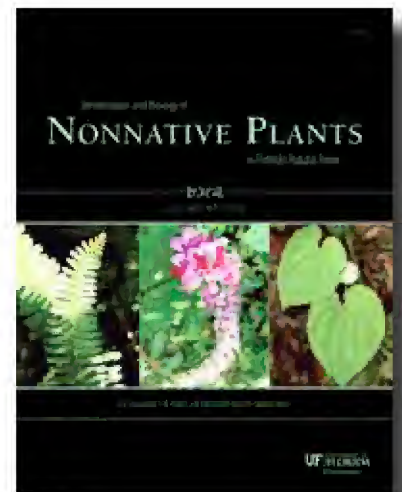
By N. Dignard, L. Couillard, J. Labrecque, P. Petitclerc and B. Tardif. 2008. 234 pp. ISBN 978-2-550-52574-5. Ministère des Ressources naturelles et de la Faune et ministère du Développement durable, de l'Environnement et des Parcs, Québec. www.mrnf.gouv.qc.ca

A handy guide to the recognition of threatened or vulnerable plants in forest habitats. The authors present forest habitats likely to shelter these plants as well as multiple color photographs, descriptive text, and maps of both recent and historical occurrence, allowing their identification for the areas of the Capital-Main Road, Center-of-Quebec of the Boiler-Appalachian Mountains and Mauricie. The guide also contains information on other threatened or vulnerable species present in these areas.

IDENTIFICATION AND BIOLOGY OF NONNATIVE PLANTS IN FLORIDA'S NATURAL AREAS*

by K.A. Langeland, H.M. Cherry, C.M. McCormick, and K.A. Craddock Burks. 2008. 210 pp. University of Florida, IFAS Publication SP 257. <http://www.ifasbooks.ufl.edu/800-226-1764>.

Second Edition — This field guide, designed to assist natural area managers in recognizing nonnative and invasive plant species on lands that they manage, will be of use to naturalists, horticulturists, landscapers, and gardeners. The authors identify 117 nonnative plant species that occur in natural areas and provide an extensive literature review of each species. Complemented by over 300 photographs, the descriptions provide plant identification characteristics, plus details on their ecological significance, distribution, and life history. The second edition of Identification and Biology of Nonnative Plants in Florida's Natural Areas combines information from the Florida Exotic Pest Plant Council (FLEPPC) List of Invasive Species, and the University of Florida Institute of Food and Agricultural Sciences Invasive Plants Working Group's Assessment of Nonnative Plants in Florida's Natural Areas.

**FIELD GUIDE TO AQUATIC INVASIVE SPECIES — IDENTIFICATION, COLLECTION AND REPORTING OF AQUATIC INVASIVE SPECIES IN ONTARIO WATERS***

by K. Jui, M. Butler, M. Allen, J. da Silva, and B. Brownson. 2008. ISBN 978-1-4249-4380-7. MNR#52089. Ministry of Natural Resources Biodiversity Section, Aquatic Invasive Species Program, Ontario, Canada.

This field guide is printed on waterproof paper and is held together with rust-proof rings – truly an aquatic field guide. It identifies over 50 aquatic invasive species of plants, fish and invertebrates and aims to aid professionals in the identification and collection of specimens and the reporting of occurrences of aquatic invasive species in Ontario waters. A reporting procedure is provided together with a hotline number (1-800-563-7711) and a website (www.invadingspecies.com). A database across the province is provided through a partnership with the Ontario Ministry of Natural Resources and the Ontario Federation of Anglers and Hunters.

***Note:** The Field Guides section of the CAIP website has been updated and greatly expanded. To look for a field guide in your area, go to <http://plants.ifas.ufl.edu/node/490>

MARY'S PICKS

Items of special interest from our reader/cataloger, Mary Langeland ~

Short-term effects of benzalkonium chloride and atrazine on *Elodea canadensis* using a miniaturised microbioreactor system for an online monitoring of physiologic parameters. By Vervliet-Scheebaum, M., Ritzenthaler, R., Normann, J., Wagner, E. 2008. *Ecotoxicol. Environ. Safety* 69(2):254-262.

"The study evaluated the effects of benzalkonium chloride (BAC) and atrazine on the macrophyte *Elodea canadensis* (Michaux) using a miniaturised monitoring test system consisting of a microbioreactor of reduced volume and integrated sensors for the online measurement of physiologic parameters, like oxygen production and different parameters of fluorescence. Different concentrations of both chemicals were applied to leaves of *E. canadensis* and the physiologic endpoints evaluated after 1 h... The mini-PAM technique implemented in the presented system allowed for a clear monitoring of the kinetic of BAC and atrazine, showing their distinct mode of action..."

There are indications "that the microbioreactor test system might be suitable, on the one hand, for the laboratory screening of potential short-term toxicity of contaminants on aquatic plants, and on the other hand, serve as an in situ field biomonitoring system for the rapid detection of pollutants in water."

Hydrothermal processing of biomass from invasive aquatic plants. By Catallo, W.J., Shupe, T.F., Eberhardt, T.L. 2008. *Biomass Bioenergy* 32(2):140-145.

"The purpose of this study was to examine the hydrothermal (HT) treatment of three invasive aquatic plants (i.e., *Lemna* sp., *Hydrilla* sp., and *Eichhornia* sp.) with respect to the generation of semi-volatile hydrocarbon product mixtures and biomass volume reduction. Identical HT treatments yielded similar semi-volatile product mixtures for *Hydrilla* sp. and *Eichhornia* sp. versus a significantly different mixture for *Lemna* sp..."

Currently, there are no data in the public domain on products resulting from HT treatment of vascular aquatic plants, particularly those which pose ecological problems (i.e., invasive or noxious nature)... Therefore, the objective of this research was to evaluate the HT treatment of three major pest aquatic plants with respect to hydrocarbon yields, chemical composition of semi-volatile mixtures, and volume reduction."

Botany - new home for tiny aquatics. By Friis, E.M., Crane, P. 2007. *Nature* 446(7133):269-270.

"Many new constellations in the angiosperm evolutionary tree have come to light as relationships within the flowering plants have been explored using molecular analyses. Some of these changes were not unexpected. But others have resulted in fundamental reinterpretations of angiosperm evolution. It will take some time to digest all the implications of suddenly introducing a new plant family into discussions of early angiosperm evolution... *Hydatella* and *Trithuria* have not been on the radar screen of most specialists working on the subject, and there are many pieces of this puzzle still to work out. Certainly, repositioning the Hydatellaceae as the closest living relatives to the Nymphaeales will dramatically influence ideas about the early evolution of water-lilies and their allies, and it will modify important details of character

evolution at the base of the angiosperm tree. *Hydatella* and *Trithuria* will inevitably be the subject of detailed investigation in the coming years. But whatever the outcomes of these studies, the radical realignment discovered by Saarela et al. should remind us not to become too comfortable with the current picture of early angiosperm relationships, and especially with the details of character evolution that they imply."

Programmed cell death and tissue remodelling in plants. By Gunawardena, A.H.L.A.N. 2008. *J. Experim. Bot.* 59(3):445-451.

"PCD is a genetically encoded active process, whereby cells organize their own destruction. The main objective of this paper is to review a few select examples of PCD-enabled remodelling in plants at the cellular, tissue, and organ levels, with an emphasis on research involving the lace plant—a model system for the study of developmentally induced PCD."

"The formation of complex leaf shape through the use of PCD is a rare event across vascular plants and occurs only in a few species of *Monstera* and related genera, and in the lace plant (*Aponogeton madagascariensis*). During early development, the lace plant leaf forms a pattern of equidistantly positioned perforations across the surface of the leaf, giving it a lattice-like appearance. Due to the accessibility and predictability of this process, the lace plant provides highly suitable material for the study of developmentally regulated PCD in plants."

The kingdom of the shore: achievement of good ecological potential in reservoirs. By Moss, B. 2008. *Freshwater Reviews* 1(1):29-42.

Moss says, in the conclusion of this article, "In the past few hundred years we have assumed that we can alter our environment at will, without consequence." Reservoirs are an example of this alteration. They "...are disabled lakes, usually lacking the diversity and function provided by a littoral zone." In the "kingdom of the shore" (a title from William Shakespeare's Sonnet LXIV), where the land and water interface, Moss suggests that "...the least damaging solutions are mechanisms that promote parsimony of use rather than response always to continued demand."

Ethnobotany of folk medicinal aquatic plants in Jordan. By Al-Qura'n, S. 2007. *Bot. Review* 73(1):51-65.

Most of the area of Jordan is desert with few water resources. It is considered to be one of the world's ten most poorly watered countries. It is in or around the "... Jordan and Yarmouk rivers, marshes, swamps, ditches, geothermal springs...in addition to small ponds and water resources where the aquatic species with therapeutic effects are found."

"This study aimed to verify the phytomedicinal wealth present in the investigated area and to determine the levels of popularity of different plants, since the investigated area has a uniquely high level of species diversity." The authors expressed the hope that the Bedouin and rural peoples would feel an increased "sense of responsibility for protecting these species from factors that threaten and endanger them. Consequently, this cultural heritage may be reinforced because it is aligned with scientific measures."

BOOK REVIEW

by Mary Langeland

FLORA IBÉRICA. ALGAS CONTINENTALES. CARÓFITOS (CHARACEAE).

by S. Cirujano, J. Cambra, P.M. Sánchez-Castillo, A. Meco, and N. Flor-Arnau. 2008. 132 pp. Real Jardín Botánico de Madrid. (in Spanish)

This 2008 Monograph of the Flora Ibérica series on the mainland algae is devoted to the characterization, identification and distribution of the Iberian charophytes, including Spain, Portugal and the Balears Isles. The slender book (only 132 pages) by Santos Cirujano, et. al was published in Spanish by the Real Jardín Botánico de Madrid. The usefulness of the book lies in the orderly arrangement and careful, detailed information and keys, based on sampling field trips, reviews of herbarium specimens and bibliographic literature.

Cirujano states that the purpose of the work is to facilitate the identification of the charophytes of the Iberian Peninsula. This has been accomplished in the book with detailed, crisply drawn illustrations, the clear photographs of specimens, and the simple, but useful keys for identification. The book



Dr. Eduardo Reyes Prósper

opens with several short, but to-the-point chapters on the history of the study of charophytes of the Iberian Peninsula, on the ecology of the charophytes, on methods of management and conservation, on their value, and the phylogeny and general morphology of charophytes.

The authors take great delight in their field of study and their enjoyment is obvious in the treatment of the historical figures of the discipline of Iberian charophytes. Honor is paid to the early experts of the field, but with some lighthearted overtones. The first general study of the Iberian charophytes was published in 1910 by Dr. Eduardo Reyes Prósper, entitled "Las Carofitas de España. Singularmente las que crecen en sus estepas." Other notable experts included in the short historical sketch are Adriano Gongalves da Cunha and Eduardo Mendes.



Eduardo Mendes

BOTANICAL SPELLING SOFTWARE – SPELLEX BOTANICAL 2008 EDITION

Billed as the most comprehensive, up-to-date, and accurate botany spell checker ever developed, this new software release includes more than 100,000 specialty words in the botanical field, including tens of thousands of vascular plants, mosses, liverworts, hornworts, and lichens from around the world.

Spellex Botanical provides accurate spelling of both common and uncommon terms from botanical taxonomy and nomenclature (including meiosis, prokaryotes, and protista as well as hundreds of dinoflagellates, haptophytes, heterokonts, bryophytes, angiosperms, fungi, euglenoids, and cryptomonads). It includes the spelling of thousands of common and scientific botanical names as well as plant families, genera, species, and symbols, including a wide variety of edible and medicinal plants and plants used for habitat creation and landscape restoration. Also includes the common and scientific names of hundreds of plant diseases including bacterial, fungal, nematodal and parasitic diseases, virus and viroid diseases, genetic diseases, and phytoplasmal diseases; includes extensive coverage of marine botany including macroalgae and microalgae, salt marshes, mangrove forests, seagrass beds, and coral reefs. Correctly spells abbreviations, acronyms, eponyms, alternative and variant spellings, and plural word forms from the botanical field.

Software works inside your favorite Microsoft, WordPerfect, or Lotus spell checker. Spellex Botanical is available in US and UK English. www.spellex.com/products/botany.htm.

FROM THE DATABASE

This is a sampling of the research articles, books and reports which have been entered into the aquatic, wetland and invasive plant database since Fall 2007. The APIRS database contains more than 71,000 citations. To use the free database online, go to <http://plants.ifas.ufl.edu/> and click on APIRS Online Database.

To obtain articles, contact your nearest academic library, or a document delivery service. Full text of records cited in APIRS is not stored electronically, however, we can assist in directing you to online resources.

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A landowner's guide to *Phragmites* control. OFFICE OF GREAT LAKES, MICHIGAN DEPT. ENVIRON. QUAL., LANSING, MI., 8 PP. 2007.

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Noxious weed identification and control handbook. INLAND EMPIRE COOPER. WEED MANAGEM. AREA, ID., 68 PP. 2007.

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Fish abundance and community composition in native and non-native plants following hydrilla colonisation at Lake Izabal, Guatemala. FISH. MANAG. ECOL. 15(2):99-106. 2008.

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Controlling aquatic weeds in a Saudi drainage canal using grass carp (*Ctenopharyngodon idella* Val.) J. FOOD AGR. ENVIRON. 5(1):332-336. 2007.

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Accumulation and distribution of heavy metals in *Scirpus americanus* and *Typha latifolia* from an artificial lagoon in San Luis Potosi, Mexico.

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Effects of pre-existing submersed vegetation and propagule pressure on the invasion success of *Hydrilla verticillata*.

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MEETINGS

Florida Aquatic Plant Management Society (FAPMS) 32nd Annual Training Conference, October 13-16, 2008. Daytona Beach, Florida. <http://www.fapms.org/meeting.html>

Hydric Soils Short Course - Specialized Training for Wetland Specialists. University of Florida, Institute of Food and Agricultural Sciences. October 21-23, 2008. Gainesville, Florida. <http://soils.ifas.ufl.edu> – click on Short Courses.

State of the Lakes Ecosystem Conference (SOLEC 2008). October 22-23, 2008. Niagara Falls, Ontario. www.epa.gov/solec

1st Asian Wetland Convention and Workshop. Society of Wetland Scientists (SWS) Asia Chapter. October 23- 26, 2008. National Taiwan University Hospital International Convention Center. Conference theme: Asian Wetlands: Global Position. <http://www.swsasiasia.org/callforpapers.html>

Oregon Watershed Enhancement Board Biennial Conference. Nov 5-7, 2008. Eugene, Oregon. http://www.oregon.gov/OWEB/biennialconference_08.shtml

North American Lake Management Society (NALMS) Symposium. Theme: Lake Management in a Changing Environment. NALMS and the Alberta Lake Management Society, November 11-14, 2008. Lake Louise, Alberta, Canada. <http://www.nalms.org/Conferences/2008LakeLouise/Program.aspx>

35th Annual Conference on Ecosystems Restoration and Creation - Assessment of Wetland Mitigation and Mitigation Banks. Theme: Assessment of Wetland Mitigation and Mitigation Banks. November 6-8, 2008. Institute of Florida Studies, Hillsborough Community College, and Patel Center for Global Solutions, University of South Florida, Plant City, Florida. <http://www.hccfl.edu/ifs/conference>

Fifty Years of Invasion Ecology - the Legacy of Charles Elton. November 12-14, 2008. Centre of Excellence for Invasion Biology, Stellenbosch University, Stellenbosch, South Africa. http://academic.sun.ac.za/cib/events/Elton_CIB_symposium.htm

2008 AGA Aquatic Gardeners Convention. November 14-16, 2008. Atlanta, Georgia. Aquatic Gardeners Association - an international nonprofit organization of aquatic plant enthusiasts that appeals to both beginners and experienced hobbyists alike. <http://www.aquatic-gardeners.org/convention.html>

Hydric Soils Short Course - Specialized Training for Wetland Specialists. University of Florida, Institute of Food and Agricultural Sciences, Soil and Water Science Department. November 18-20, 2008. Gainesville, Florida. <http://soils.ifas.ufl.edu>

International Symposium on “Perspectives in Pteridophytes.” November 27-29, 2008. National Botanical Research Institute, Council of Scientific and Industrial Research, Lucknow, India, and the Indian Fern Society. http://www.nbri-lko.org/NBRI_EVENT08/Perspectives%20in%20Pteridophytes.pdf

Northeast Aquatic Plant Management Society meeting. January 19th -21st, 2009. Saratoga Springs, New York. www.neapms.net/

24th Annual Conference Illinois Lake Management Association. February 19th - 21st, 2009 Peoria, Illinois. Email: ilma@ilma-lakes.org WWW: <http://www.ilma-lakes.org/conference.html>

29th Annual Midwest Aquatic Plant Management Society (MAPMS) Conference. March 1-4, 2009. Chicago area, Illinois. <http://www.mapms.org/MAPMSConf2009.html>

16th International Conference on Aquatic Invasive Species. April 19-23, 2009. Montreal, Quebec, Canada. www.icaais.org/

2009 Aquatic Weed Control Short Course. May 4-7, 2009. Coral Springs, Florida. <http://conference.ifas.ufl.edu/aw>

52nd Annual Conference International Association for Great Lakes Research. Theme: Bridging Ecosystems & Environmental Health across our Great Lakes. May 18 - 22, 2009. Toledo, Ohio. <http://iaglr.org/conference/locations.php>

Society for Wetland Scientists. Theme: Wetland Connections. June 22-26, 2009. Madison, Wisconsin. www.sws.org/2009_meeting/

11th International Paleolimnology Symposium. International Paleolimnology Association. June 23-26, 2009. Guadalajara, Jalisco, Mexico. <http://www.paleolim.org/index.php/symposia/>

10th International Conference on the Ecology and Management of Alien Plant Invasions (EMAPI). August 23-27, 2009. Centre for Invasion Biology (CIB), Department of Botany & Zoology, Stellenbosch University, Stellenbosch, South Africa. www.emapi2009.co.za or rich@sun.ac.za

12th EWRS International Symposium on Aquatic Weeds Jyväskylä, Finland - August 2009

The **European Weed Research Society** will present the 12th EWRS International Symposium on Aquatic Weeds on August 24 – 28, 2009 in Jyväskylä, Finland. The symposium will bring together professionals involved in research, management, extension and practical uses of aquatic plants in order to exchange results, experiences, and information. The main theme of the symposium will be “Aquatic invasions and their relation to environmental changes.” Main topics are: Biology of Aquatic Plants - Indicator value of Aquatic Plants - Management of Aquatic Vegetation - Practical Uses of Aquatic Plants - Aquatic Plants as Elements of the EU Water Framework Directive

Download the first announcement at: http://www.ewrs.org/pdf/EWRS_Aquatic_weeds_12th_symposium.pdf or
E-mail: invasive-plants@ewrs.org or URL: <http://www.ewrs.org/ewrs-iw.htm>

ORGANISERS

This symposium will be organised by the EWRS through its Working Group on Invasive Plants, in collaboration with the Working Group on Macrophytes of the International Society on Limnology (SIL), and the Finnish Environment Institute (SYKE).

SCIENTIFIC COMMITTEE

Christian Bohren, Joe Caffrey, Frauke Ecke, Teresa Ferreira, Jacques Hauray, Kaisa Heikkinen, Seppo Hellsten, Georg Janauer, Timo Kairesalo, Antti Kanninen, Kevin Murphy, Arnold Pieterse, Jukka Salonen, Jouko Sarvala, Krzysztof Szoszkiewicz, Heikki Toivonen, Ludwig Triest, and Pertti Uotila.

Previous EWRS symposia on aquatic weeds have been held in La Rochelle (1964), Oldenburg (1967), Oxford (1971), Vienna (1974), Amsterdam (1978), Novi Sad (1982), Loughborough (1986), Uppsala (1990), Dublin (1994), Lisbon (1998) and Moliets et Maâ (2002). For details on the EWRS Invasive Plants Working Group, go to: <http://www.ewrs.org/IW/default.asp>

5th International Weed Science Congress - Aquatic Weed Control Session

The **5th International Weed Science Congress** took place during the week of June 22nd, 2008 in Vancouver, Canada, and was co-hosted by the International Weed Science Society, the Canadian Weed Science Society, and the Weed Science Society of America.

This meeting is held every four years and over 500 meeting delegates from 46 countries represented academia, government, non-governmental organizations, and private industry research. A main topic session on aquatic weed control was co-organized by Dr. Michael Netherland, US Army ERDC, USA, and Dr. Kevin Murphy, University of Glasgow, Scotland. Invited talks were given by Dr. Sidnei Thomaz (Brazil) on the spread of invasive plants in Brazilian reservoirs and Dr. Mic Julien (France) on water hyacinth dynamics and biocontrol in Lake Victoria, Africa. Papers selected for oral presentation included: 1) Dr. Pat Chambers (Canada) on worldwide distribution of aquatic macrophytes; 2) Dr. Joe Caffrey (Ireland) on lagarosiphon invasion in Irish lochs; 3) Mr. Jeff Schardt (USA) on the linkage between operational aquatic plant control and research in Florida; 4) Dr. John Madsen (USA) on Eurasian watermilfoil eradication efforts in Idaho; 5) Dr. Rob Richardson (USA) on the use of ALS inhibitors for aquatic plant control in the United States; 6) Dr. Matthew O'Hare (UK) on issues with aquatic plants and water conveyance in rivers; 7) Dr. Michael Smart (USA) on integrating ecological principles in aquatic plant control efforts; 8) Ms. Pauline Lang (UK) on distribution of native and invasive plants in Zambia, Africa; 9) Dr. Robinson Pitelli (Brazil) on control of invasive aquatic grasses in Brazil; and 10) Dr. Cody Gray (USA) on control of aquatic macrophytes in irrigation canals. There were also numerous posters presented as part of this session. Other papers on aquatic weeds

were presented in different sessions throughout the conference. The program is available at <http://iws.ucdavis.edu/>

The International Weed Science Society (IWSS) is a worldwide scientific organization that was formed in 1975 by individuals from Europe, North America, South America, and the Asian-Pacific area to deal with global weed science issues. The formation of IWSS was promoted actively by the six existing regional weed science societies (Asian-Pacific, European, Latin American, American, East and West African). The Society has held highly successful International Weed Control Congresses in Australia (1992), Denmark (1996), Brazil (2000), South Africa (2004), and Vancouver, Canada (2008).

PODOSTEMACEAE Website

Podostemaceae range worldwide on all continents with tropical climates. Most of the members occur in tropical and subtropical rivers and waterfalls. Many of the c. 48 genera and c. 280 species are endemic to small geographical areas or even a single river or waterfall. This website contains drawings of all African species, photographs of African podos, keys, and a literature list, together with much more information: Rutishauser R., Pfeifer E., Grob V. & Bernhard A. (2007): *Podostemaceae of Africa and Madagascar: Keys to Genera and Species, Including Genera Descriptions, Illustrations to All Species Known, Synonyms, and Literature List*. Version 20-07-2007.

<http://www.systbot.uzh.ch/podostemaceae>

Dr. Rutishauser and colleagues at the Institute of Systematic Botany in Zurich focus on “morphological misfits,” conservation biology, and other aspects of aquatic vascular plants.

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AQUAPHYTE

AQUAPHYTE is the newsletter of the Center for Aquatic and Invasive Plants (CAIP) and the Aquatic, Wetland and Invasive Plant Information Retrieval System (APIRS) of the University of Florida / Institute of Food and Agricultural Sciences (UF/IFAS). Support for **AQUAPHYTE** and the information system is provided by the Florida Fish and Wildlife Conservation Commission, Invasive Plant Management Section; the St. Johns River Water Management District; and UF/IFAS.

EDITOR: Karen Brown

AQUAPHYTE is sent to managers, researchers and agencies in 71 countries around the world. Comments, announcements, news items and other information relevant to aquatic and invasive plant research are solicited.

Inclusion in **AQUAPHYTE** does not constitute endorsement, nor does exclusion represent criticism, of any item, organization, individual, or institution by the University of Florida.

UF UNIVERSITY of
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Mare's-tail in Colorado Waters

Hippuris vulgaris (Hippuridaceae) occurs in the southwestern and northern USA, including Alaska. This population was found at high elevation (around 8,800') in San Miguel County in western Colorado. Currently residing with a native milfoil, it is becoming a problem in this pond. Mare's-tail is considered endangered or threatened in some states.

Photo by Sheila Grother, San Miguel County Weed Program Manager.